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ABSTRACT

Evaluation of an ESEA Title III project, "An Inter-Disciplinary Problem Solving Approach to Environmental Education" located in Berks County, Pennsylvania, is offered in this interim report. The report is primarily concerned with the degree to which operational and management process objectives are being achieved in each of four components: instruction, staff development, materials development, and community involvement. Comments are directed toward the already completed product objectives as they relate to experimental groups at both the fifth- and seventh-grade levels. A variety of methods were employed in the analysis procedure: student pre- and posttest scores; on-site visits; individual discussions; records of project activities; questionnaires; rating scales; and reviews of reports submitted by teachers and staff. Summary statements indicate that the project has been extremely successful in utilizing its expertise, staff, and facilities; stated objectives have been met at levels consistently above what was expected; the environmental knowledge of participating students has improved significantly; and students have changed their attitudes towards the environment in a more positive direction. However, community development was not proceeding as planned, primarily in relation to the creation, continuation, and integration of local and central advisory committees. (BL)

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# INTERIM EVALUATION REPORT
# INTERMEDIATE UNIT NO. 14's
# ENVIRONMENTAL EDUCATION PROJECT
# "AN INTER-DISCIPLINARY PROBLEM SOLVING APPROACH TO ENVIRONMENTAL EDUCATION"

February 1, 1973

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## I. INTRODUCTION

This is the second in a series of on-going written and oral reports submitted by Educational Research and Development Associates (ERANDA) to evaluate the Berks County Intermediate Unit's ESEA Title III, (Section 306) Project OE 7107229, "An Inter-Disciplinary Problem Solving Approach in Environmental Education". Constant oral interchange occurs between the Project Director, his staff, and ERANDA in the intervals between formally written and submitted reports.

This interim report will be primarily concerned with the degree to which the operational and management process objectives are being achieved in each of the four components: instruction, staff development, materials development, and community involvement. Comments will be directed toward the already completed product objectives as they relate to the fall experimental groups at both the fifth and seventh grade levels. The Implementation Report was favorable in most respects. Favorable areas in the report have remained favorable and, as such, only those few areas receiving unfavorable comments in the report will be addressed herein.

This report has been prepared after a thorough examination of the objectives utilizing the following:

1. Analysis of student growth in environmental knowledge and attitudinal change in the six 5th grade and five 7th grade fall experimental groups. The significance of cognitive growth of the experimental groups was determined by a correlated t-test based upon students' pre and post test scores on a locally-developed, contest-valid examination. Cognitive growth in the experimental group was compared, through an analysis of covariance, to that of appropriate control groups. The significance of attitudinal change in the experimental groups was determined by a correlated t-test based upon students' pre and post scores on a locally-developed Likert-type scale. Attitudinal change in the experimental group was compared, through an analysis of covariance, to that of

appropriate control groups. Adequacy of instruments and control groups was discussed in the Implementation Report.

2. Periodic on-site visits to Nolde Project Headquarters by ERANDA.
3. On-site visits to all fall experimental schools by ERANDA.
4. Individual discussions with each fall experimental teacher by ERANDA.
5. Review of records of activities of fall experimental schools as recorded in teacher's logs by ERANDA.
6. Final reports on each experimental school program prepared by Nolde Staff.
7. Record of project activities as recorded in staff logs.
8. Results of questionnaires submitted to local and central community advisory committee, speakers, control and experimental teachers, and students and staff.
9. Ratings of project teachers, staff and guides by Project Director.
10. Reports submitted by Director and staff.
11. Minutes of staff and community advisory council.
12. Observations of pre and post testing procedures by ERANDA.

General Comments: The Nolde State Forest Environmental Project has consistently produced high quality results with a minimum staff and budget. This success is largely due to the efforts of its Director, Mr. Louis Ritrovato. The addition of a secondary coordinator has made possible an extension of the program to the seventh grade level. The introduction of environmental education into secondary schools has caused a ripple effect to occur already generating interest in individual study programs at the senior high level.

The Center reflects its ability to reach larger and larger numbers of school and community persons by its remarkable increase in monthly attendance at the Nolde site over the first year of operation. The only

area of concern still evident is at the local community level and effort is being expended to correct this problem. In spite of its growing need for more staff, the overall program continues to be not only meeting its objectives but constantly widening and deepening its direction.

## II. EVALUATION OF INSTRUCTIONAL PRODUCT OBJECTIVES

The Nolde Forest Project, in order to make services available to as large a population as possible, has sub-divided the school year into three 12-week components (fall, winter and spring) with selected experimental schools at the fifth and seventh grade levels in each component. The Interim Report will include product results from the first component which was completed in December. The other two units will be discussed in the Final Report.

The experimental and control schools were chosen by the Project Director so as to be representative of rural, suburban, and urban populations within the Project's service area. The control students will serve as controls for the winter and spring experimental groups as well as the fall. The student groups were analyzed separately by grade (fifth and seventh) and by area (rural, suburban and urban), six groupings in all. The analyses included a correlated t-test to determine the statistical significance of the growth in environmental knowledge (Table I)* and the attitudinal change in the students towards a more positive environmental attitude (Table II)* for each of the six experimental groupings. The experimental groups were then compared to their respective control groups, using an analysis of covariance (Tables III - XIV)*, to determine if growth were different than what would be expected if the students had not been involved in the project or similar activities.

Table I* indicates that each of the six experimental groupings demonstrated statistically significant growth in environmental knowledge at a probability level less than .001.

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*All Tables for the Instructional Product Component follow the discussion.

Table II* indicates that each of the six experimental groupings demonstrated statistically significant changes in their expression of a more positive attitude towards the environment at probability levels ranging from less than .001 to less than .10 depending upon the grouping.

Tables III* through VIII* are the results of analyses of covariances on each of the six groupings when the growth in the groupings' environmental knowledge was compared to its control.

Tables III* and IV* indicate that cognitive growth in environmental knowledge of the experimental urban groups, grades 5 and 7, was significantly ($p < .001$) greater than respective control groups when post results were adjusted for beginning differences in the groups. An analysis of variance performed on pre test score results gave no reason to believe significant differences ($\alpha = .05$) between the groups at project start.

Tables V* and VI* indicate that the growth in environmental knowledge of the experimental rural groups, grades 5 and 7, was significantly ($p < .001$) greater than their respective control groups, after adjustment for beginning differences between the groups. An analysis of variance on pre score test results showed no reason to believe significant differences ($\alpha = .05$) between the groups at the beginning of the project.

Table VII* indicates that cognitive growth for the experimental seventh grade suburban group to be significantly ($p < .10$) greater than its control group when post test results were adjusted for beginning differences. An analysis of variance performed on the pre test scores showed the experimental group possessing more environmental knowledge than its control group at the start of the project. However, the analysis of covariance was able to adequately adjust for these differences (F-test on group regressions was not significant).

Table VIII* indicates that cognitive growth for the experimental fifth grade suburban group, although significant (Table I), was not significantly more ($p > .25$) than its control group when post test scores were adjusted for

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*All Tables for the Instructional Product Component follow the discussion.

beginning differences in pre test scores. An analysis of variance performed on the pre test scores gave no reason to believe significant differences ($\alpha = .05$) existed between the groups at project start.

Table IX* indicates that attitudinal shift about the environment for the experimental fifth grade urban group was significantly ($p < .02$) towards a more positive attitude than was the shift in its control group, when post test results were adjusted for pre test differences. An analysis of variance performed on the pre test scores, showed the experimental group possessing a more positive attitude towards the environment than its control group at the start of the project. However, the analysis of covariances was able to adequately adjust for these differences (F-test on group regressions was not significant).

Table X* indicates that the attitudinal shift about the environment for the experimental seventh grade urban group was significantly ($p < .001$) towards a more positive attitude than was the shift in its control group after post test results were adjusted to reflect beginning differences in attitudes between the groups. An analysis of variance performed on the pre test results gave no reason to believe significant differences ($\alpha = .05$) existed between the groups at project start.

Similarly, Table XI* indicates that the attitudinal shift about the environment for the experimental fifth grade suburban group was significantly ($p < .05$) towards a more positive attitude than its control group. With no significant differences ($\alpha = .05$) in attitude between the two groups being found at the start of the project.

Tables XII* (fifth grade rural), XIII* (seventh grade rural) and XIV* (seventh grade suburban) indicate that the attitudinal shifts, although significant (Table II*), were not significantly more ($p > .15$) in a positive direction than respective control groups when post test results were adjusted for attitudinal differences between the experimental and control groups at the start of the project. Analyses of variance performed on the pre test scores

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*All Tables for the Instructional Product Component follow the discussion.

gave no reason to believe significant ($\alpha = .05$) differences existed between the fifth grade rural group and its control, nor the seventh grade rural group and its control. However, beginning differences did exist between the seventh grade suburban group and its control. The experimental group exhibited a more positive attitude than its control at the start of the project. In this case, the analysis of variance procedure was again able to sufficiently adjust for these beginning differences (F-test on group regression coefficients was not significant).

In summary, the experimental students at fifth and seventh grade grew significantly in their knowledge about the environment and became more positive in their attitude toward it. When compared with their respective control students, the urban, rural and seventh grade suburban schools experienced significantly greater growth in knowledge about the environment than did the control groups. The fifth grade suburban schools did not experience such a growth.

A more positive attitudinal change towards the environment was experienced by the urban schools and the fifth grade suburban school than their respective control groups. This was not the case for the rural schools nor the seventh grade experimental school.

It seems that all the emphasis being currently placed on the environment is having its effect. All students seemingly are becoming more positive towards the environment; for some project students the attitudinal shift is a little larger than other students. In all cases, except the fifth grade suburban group, project students are becoming more knowledgeable than if they did not participate in the project. This seems to be more true for urban students. The urban students seem to be benefiting most from contact with the project.

Table I

Change in Environmental Knowledge
in Pre and Post Testing
of Fall Experimental Students

| Area | Grade | N | Mean Pre | Mean Post | Chg. | Stand. Error | Corr. t | Probability |
|---|---|---|---|---|---|---|---|---|
| Rural | 5 | 67 | 20.03 | 23.67 | 3.64 | .69 | 5.25 | p<.001 |
| Suburban | 5 | 52 | 21.52 | 25.08 | 3.56 | .82 | 4.32 | p<.001 |
| Urban | 5 | 52 | 20.58 | 28.40 | 7.82 | .64 | 12.30 | p<.001 |
| Rural | 7 | 53 | 27.45 | 32.13 | 4.68 | .65 | 7.25 | p<.001 |
| Suburban | 7 | 48 | 26.94 | 31.98 | 5.04 | .83 | 6.09 | p<.001 |
| Urban | 7 | 26 | 21.04 | 28.31 | 7.27 | .78 | 9.32 | p<.001 |

Table II

Change in Environmental Attitude*
in Pre and Post Testing
of Fall Experimental Students

| Area | Grade | N | Mean Pre | Mean Post | Chg. | Stand. Error | Corr. t | Probability |
|---|---|---|---|---|---|---|---|---|
| Rural | 5 | 67 | 2.68 | 2.58 | -.10 | .05 | -2.23 | p<.05 |
| Suburban | 5 | 52 | 2.51 | 2.38 | -.13 | .04 | -3.45 | p<.01 |
| Urban | 5 | 52 | 2.47 | 2.29 | -.18 | .04 | -4.16 | p<.001 |
| Rural | 7 | 53 | 2.23 | 2.14 | -.09 | .05 | -1.85 | p<.10 |
| Suburban | 7 | 48 | 2.38 | 2.21 | -.17 | .04 | -3.83 | p<.001 |
| Urban | 7 | 26 | 2.54 | 2.32 | -.22 | .06 | -3.76 | p<.001 |

*A lower score is associated with a more positive attitude.

Table III

Comparison of Urban Fifth Grade Fall Experimental and Control Students on Overall Environmental Knowledge

Sum of Squares — N-Exp.=52 N-Cont.=26

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | 31.4141 | 290.828 | 95.5781 |
| Within | 76 | 2268.54 | 2147.63 | 1551.65 |
| Total | 77 | 2299.95 | 2438.46 | 1647.23 |

Analysis of Covariance

| Variation | D/F | Pre | Post | Pre x Post | Probability |
|---|---|---|---|---|---|
| Between | 1 | 172.39 | 172.39 | 11.9019 | p<.001 |
| Within | 75 | 1086.32 | 14.4843 | | |
| Total | 76 | 1258.71 | 16.562 | | |

| | X | Y |
|---|---|---|
| Total Sum | 1246 | 1608 |
| Grand Mean | 15.9744 | 20.6154 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 16.4231 | 21.9808 | 21.6739 |
| 2 | 15.0769 | 17.8846 | 18.4985 |

Regression Coefficient = .683989

Table IV

Comparison of Urban Seventh Grade Fall Experimental and Control Students on Overall Environmental Knowledge

N-Exp.=26 N-Cont.=16

Sum of Squares

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | 6.93164 | 250.008 | 41.6289 |
| Within | 40 | 864.711 | 788.398 | 547.586 |
| Total | 41 | 871.643 | 1038.41 | 589.215 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | 198.473 | 198.473 | 17.5268 | $p<.001$ |
| Within | 39 | 441.635 | 11.324 | | |
| Total | 40 | 640.108 | 16.0027 | | |

| | X | Y |
|---|---|---|
| Total Sum | 741 | 905 |
| Grand Mean | 17.6429 | 21.5476 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 17.9615 | 23.4615 | 23.2597 |
| 2 | 17.125 | 18.4375 | 18.7654 |

Regression Coefficient = .633259

Table V

Comparison of Rural Fifth Grade Fall Experimental and Control Students on Overall Environmental Knowledge

N-Exp.=67 N-Cont.=22

Sum of Squares

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | 104.074 | 29.4023 | -55.3164 |
| Within | 87 | 2465.52 | 3086.12 | 2087.93 |
| Total | 88 | 2569.59 | 3115.53 | 2032.62 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | 189.722 | 189.722 | 12.3799 | $p < .001$ |
| Within | 86 | 1317.95 | 15.325 | | |
| Total | 87 | 1507.67 | 17.3296 | | |

| | X | Y |
|---|---|---|
| Total Sum | 1430 | 1578 |
| Grand Mean | 16.0674 | 17.7303 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 15.4478 | 18.0597 | 18.5845 |
| 2 | 17.9545 | 16.7273 | 15.1292 |

Regression Coefficient = .846853

Table VI

Comparison of Rural Seventh Grade Fall Experimental and Control Students on Overall Environmental Knowledge

N-Exp.=53 N-Cont.=52

Sum of Squares

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | 31.9609 | 274.469 | 93.6562 |
| Within | 103 | 1683.43 | 2011.09 | 956.359 |
| Total | 104 | 1715.39 | 2285.56 | 1050.02 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | 175.048 | 175.048 | 12.1645 | $p<.001$ |
| Within | 102 | 1467.78 | 14.39 | | |
| Total | 103 | 1642.83 | 15.9498 | | |

| | X | Y |
|---|---|---|
| Total Sum | 2318 | 2546 |
| Grand Mean | 22.0762 | 24.2476 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 22.6226 | 25.8491 | 25.5386 |
| 2 | 21.5192 | 22.6154 | 22.9318 |

Regression Coefficient = .568102

Table VII

Comparison of Suburban Seventh Grade Fall Experimental and Control Students on Overall Environmental Knowledge

N-Exp.=48 N-Cont.=106

Sum of Squares

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | 1278.28 | 870.187 | 1054.67 |
| Within | 152 | 5083.8 | 4950.15 | 2936.59 |
| Total | 153 | 6362.09 | 5820.34 | 3991.26 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | 62.5459 | 62.5459 | 2.90252 | $p<.10$ |
| Within | 151 | 3253.87 | 21.5488 | | |
| Total | 152 | 3316.42 | 21.8185 | | |

| | X | Y |
|---|---|---|
| Total Sum | 2703 | 3152 |
| Grand Mean | 17.5519 | 20.4675 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 21.8333 | 24 | 21.5269 |
| 2 | 15.6132 | 18.8679 | 19.9878 |

Regression Coefficient = .577636

Table VIII

Comparison of Suburban Fifth Grade Fall Experimental and Control Students on Overall Environmental Knowledge

N-Exp.=52 N-Cont.=62

Sum of Squares

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | 52.0078 | 46.9062 | 49.3906 |
| Within | 112 | 1885.93 | 2871.73 | 1316.14 |
| Total | 113 | 1937.94 | 2918.63 | 1365.53 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | 3.21021 | 3.21021 | .182432 | p>.25 |
| Within | 111 | 1953.23 | 17.5967 | | |
| Total | 112 | 1956.44 | 17.4682 | | |

| | X | Y |
|---|---|---|
| Total Sum | 1775 | 2016 |
| Grand Mean | 15.5702 | 17.6842 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 16.3077 | 18.3846 | 17.8699 |
| 2 | 14.9516 | 17.0968 | 17.5285 |

Regression Coefficient = .697872

Table IX

Comparison of the Change of Attitude*
by Control and Urban Fall Fifth
Grade Experimental Students

N-Exp.=52 N-Cont.=25

Sum of Squares

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | .687988 | 1.5694 | 1.03918 |
| Within | 75 | 7.56757 | 8.65424 | 3.89954 |
| Total | 76 | 8.25555 | 10.2236 | 4.93872 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | .624321 | .624321 | 6.95275 | $p<.02$ |
| Within | 74 | 6.64482 | 8.97949E-02 | | |
| Total | 75 | 7.26914 | 9.69219E-02 | | |

| | X | Y |
|---|---|---|
| Total Sum | 195.4 | 184.5 |
| Grand Mean | 2.53766 | 2.3961 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 2.47212 | 2.29712 | 2.33089 |
| 2 | 2.674 | 2.602 | 2.53175 |

Regression Coefficient = .515296

*A lower score indicates a more positive attitude.

Table X

Comparison of the Change of Attitude* by Control and Urban Fall Seventh Grade Experimental Students

N-Exp.=26 N-Cont.=15

Sum of Squares

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | .284546 | 1.72641 | .700806 |
| Within | 39 | 2.94745 | 3.75903 | 1.74817 |
| Total | 40 | 3.23199 | 5.48544 | 2.44897 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | .907613 | .907613 | 12.6698 | $p < .001$ |
| Within | 38 | 2.72217 | 7.16361E-02 | | |
| Total | 39 | 3.62979 | 9.30714E-02 | | |

| | X | Y |
|---|---|---|
| Total Sum | 106.75 | 101.4 |
| Grand Mean | 2.60366 | 2.47317 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 2.54038 | 2.31731 | 2.35484 |
| 2 | 2.71333 | 2.74333 | 2.67828 |

Regression Coefficient = .593113

*A lower score indicates a more positive attitude.

Table XI

Comparison of the Change of Attitude*
by Control and Suburban Fall Fifth
Grade Experimental Students

Sum of Squares — N-Exp.=52 N-Cont.=64

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | .415771 | 1.39185 | .760742 |
| Within | 114 | 12.584 | 15.9954 | 8.35962 |
| Total | 115 | 12.9998 | 17.3872 | 9.12036 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | .546535 | .546535 | 5.91442 | $p<.05$ |
| Within | 113 | 10.442 | 9.24072E-02 | | |
| Total | 114 | 10.9886 | 9.63908E-02 | | |

| | X | Y |
|---|---|---|
| Total Sum | 298.15 | 290.6 |
| Grand Mean | 2.57026 | 2.50517 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 2.50385 | 2.38366 | 2.42777 |
| 2 | 2.62422 | 2.60391 | 2.56806 |

Regression Coefficient = .664306

*A lower score indicates a more positive attitude.

Table XII

Comparison of the Change of Attitude*
by Control and Rural Fall Fifth
Grade Experimental Students

Sum of Squares N-Exp.=67 N-Cont.=23

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | 3.38135E-02 | .201172 | -8.26416E-02 |
| Within | 88 | 8.43774 | 14.2963 | 4.69434 |
| Total | 89 | 8.47156 | 14.4974 | 4.61169 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | .30238 | .30238 | 2.25143 | p>.15 |
| Within | 87 | 11.6846 | .134305 | | |
| Total | 88 | 11.987 | .136215 | | |

| | X | Y |
|---|---|---|
| Total Sum | 240.7 | 234.76 |
| Grand Mean | 2.67444 | 2.60844 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 2.68582 | 2.58075 | 2.57442 |
| 2 | 2.6413 | 2.68913 | 2.70757 |

Regression Coefficient = .55635

*A lower score indicates a more positive attitude.

Table XIII

Comparison of the Change of Attitude*
by Control and Rural Fall Seventh
Grade Experimental Students

Sum of Squares N-Exp.=53 N-Cont.=51

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | .157837 | .34906 | .234741 |
| Within | 103 | 9.49646 | 11.2265 | 5.08557 |
| Total | 104 | 9.6543 | 11.5756 | 5.32031 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | .14057 | .14057 | 1.68623 | p>.20 |
| Within | 102 | 8.50306 | 8.33633E-02 | | |
| Total | 103 | 8.64363 | 8.39188E-02 | | |

| | X | Y |
|---|---|---|
| Total Sum | 238.5 | 231.45 |
| Grand Mean | 2.27143 | 2.20429 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 2.23302 | 2.14717 | 2.16774 |
| 2 | 2.31058 | 2.2625 | 2.24154 |

Regression Coefficient = .535523

*A lower score indicates a more positive attitude.

Table XIV

Comparison of the Change of Attitude* by Control and Suburban Fall Seventh Grade Experimental Students

Sum of Squares — N-Exp.=48 N-Cont.=108

| Variation | D/F | Pre | Post | Pre x Post |
|---|---|---|---|---|
| Between | 1 | .686035 | .977783 | .819092 |
| Within | 154 | 20.0542 | 24.4792 | 13.1431 |
| Total | 155 | 20.7402 | 25.457 | 13.9622 |

Analysis of Covariance

| Variation | D/F | Sum of Sq. | Mean Sq. | F-Ratio | Probability |
|---|---|---|---|---|---|
| Between | 1 | .192238 | .192238 | 1.85385 | $p > .20$ |
| Within | 153 | 15.8656 | .103697 | | |
| Total | 154 | 16.0578 | .104272 | | |

| | X | Y |
|---|---|---|
| Total Sum | 386.18 | 364 |
| Grand Mean | 2.47551 | 2.33333 |

| Group | Means for X | Means for Y | Adjusted Means |
|---|---|---|---|
| 1 | 2.37604 | 2.21458 | 2.27977 |
| 2 | 2.51972 | 2.38611 | 2.35714 |

Regression Coefficient = .655377

*A lower score indicates a more positive attitude.

Although the performance objective 1.1.9 is scheduled for completion in May, those students and teachers involved in the fall session (Table XV) indicate (with 10 of the 11 teachers responding) that the criterion of 90% of the project students involved in the solution of an environmental problem was met, while all (100%) of the students (see Table XV) felt they had been involved. Although not criterion referenced, the control teachers and students responses to the same question (see Table XV) indicate that in only one instance was an environmental problem discussed.

Table XV

Comparison of Experimental and Control Students and Teachers in Identifying and Solving Environmental Problem in School

| | Teacher | | | | Student | | | |
|---|---|---|---|---|---|---|---|---|
| | Yes | | No | | Yes | | No | |
| | N | % | N | % | N | % | N | % |
| Experimental | 9 | 90 | 1 | 10 | 50 | 100 | 0 | 0 |
| Control | 1 | 12.5 | 8 | 87.5 | 9 | 22.5 | 31 | 78.5 |

One might argue that involvement of experimental students in environmental problems and solutions in the classroom might not be attributable to interest but rather to the mandatory nature of formal education; however, participation in community activities is strictly voluntary. Students volunteering to work on community environmental projects is indicative of the ripple effect of the Nolde program and also the generated interest in our environment. In response to the student questionnaire, 70% of the students indicated they had been or were

involved in community environmental activities. This far exceeds the 10% established criterion for performance objective 1.10.

## III. EVALUATION OF INSTRUCTIONAL OPERATION PROCESS OBJECTIVES

It is important that evaluation of the instructional process be observed and rated by the Project Director or a member of his staff to determine the experimental teacher's expertise, enthusiasm, knowledge of the project and the general classroom teaching/learning situation. In November, Mr. Ritrovato, Project Director, rated the fall experimental teachers and these ratings appear in Table XVI.

Performance objectives 1.2.1, 2, and 6 require a rating of at least three on a five-point scale for use of curriculum materials, outside materials, and for demonstration of enthusiasm in working on the project.

Table XVI indicates all teachers (100%) exceeded this rating on objective 1.2.1, 1.2.2, while on objective 1.2.6 all but one teacher (90%) were rated 4 or better.

The teacher's log is the instrument devised to record and/or reinforce these operational process objectives: the identification and solution of a local problem (1.2.3), Nolde field trips (1.2.4), the use of community resource personnel (1.2.5) and facilities (1.2.7) in addition to verifying that such reports exist (1.2.8). Table XVII summarizes the ERANDA findings. This log acts as an excellent tool for cross-indexing other evaluation instruments.

Table XVI

Project Director's Rating - Fall Experimental Teachers

November 29, 1972

N=11

| | Evaluation | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 1. | Use of project curriculum materials | 9 | 2 | 0 | 0 | 0 |
| 2. | Supplement of project activities with outside materials | 9 | 2 | 0 | 0 | 0 |
| 3. | Demonstrated enthusiasm toward project (teacher) | 7 | 3 | 1 | 0 | 0 |
| 4. | Students demonstrated enthusiasm toward project | 7 | 3 | 1 | 0 | 0 |
| 5. | Knowledge of project curriculum | 9 | 2 | 0 | 0 | 0 |
| 6. | Knowledge of project facilities | 10 | 1 | 0 | 0 | 0 |
| 7. | Understanding of project philosophy | 6 | 4 | 1 | 0 | 0 |
| 8. | Teaching ability | 9 | 2 | 0 | 0 | 0 |
| 9. | Ability to evaluate student's performance | 8 | 3 | 0 | 0 | 0 |
| 10. | Knowledge of other community environmental facilities | 7 | 4 | 0 | 0 | 0 |
| 11. | Knowledge of community resource personnel | 2 | 7 | 2 | 0 | 0 |
| 12. | Attitude toward project | 8 | 3 | 0 | 0 | 0 |

Scale: A: Excellent
B: Good
C: Fair
D: Poor
E: Unacceptable

Table XVII

Teacher's Log Report
Fall Experimental Group

N-11

| | | Yes | | No | |
|---|---|---|---|---|---|
| | | N | % | N | % |
| 1.2.8 | Prepared Log | 11 | 100% | 0 | 0 |
| 1.2.3 | Identify Problem | 11 | 100% | 0 | 0 |
| 1.2.3 | Discuss Solution | 11 | 100% | 0 | 0 |
| 1.2.4 | *Nolde Field Trip | 11 | 100% | 0 | 0 |
| 1.2.5 | **Used Community Resource Personnel | 6 | 54% | 5 | 46 |
| 1.2.7 | ***Used Community Resource Facilities | 8 | 72% | 3 | 27 |

* 7 indicated two trips

** 2 indicated more than one

*** 4 indicated more than one

All eleven fall experimental teachers submitted teacher logs (100%) meeting the established criterion for 1.2.8. The criterion of 100% was also met for 1.2.3, while 1.2.4 was met by all and exceeded by 7 experimental schools who visited Nolde twice. The criterion of 20% for objectives 1.2.5 and 1.2.7 were exceeded when 6 (54%) of the groups used community resource personnel and 8 (72%) used community facilities (see Table XVII).

The objective requiring post testing of experimental students was met on December 11 and 12 and was observed by ERANDA to determine that correct testing procedures were followed.

The Operational Process Objectives were met in all instances and exceeded in those already indicated.

## IV. EVALUATION OF THE FALL EXPERIMENTAL SCHOOLS

Utilizing three diverse sources of information, the fall experimental schools were evaluated.

1. Teacher logs not only provide specific information to determine the degree to which behavioral objectives have been met but include much soft data of a very valuable nature.
2. The ERANDA staff has visited each fall experimental school and spoke with teachers (and students where feasible).
3. The Nolde staff member responsible for the school has written a comprehensive report, Evaluation of Fall Experimental School Programs.

They are presented in two sections: Primary (5th grade experimental schools) and Secondary (7th grade experimental schools).

Primary:

Womelsdorf Elementary School - 5th Grade
Teacher: Mr. John Zug

The students in Mr. Zug's fifth grade demonstrated an increasing concern for their environment. This was evidenced by the energy with

which they approached all their activities, especially their development of a 44-item community questionnaire. Other projects which evoked students' interests included the establishment of an outdoor study area, building bird feeders, water studies, and an analysis of effects of water on different paper products. Mr. Zug reports that his students have been very responsive to the project, especially their visits to the Nolde facilities.

Parent reactions appear to have been favorable. Parents cooperated by leading small groups on field trips and one lady bothered to contact the principal and indicate that she was impressed with the student's involvement in community problems.

One valuable by-product of the project was the development of an outdoor education area to be used by other groups in the school. Mr. Zug compiled a guide booklet including a description of a nature trail, and suggested activities. These efforts cannot help but broaden the sphere of influence the Nolde project will eventually realize.

Blue Mt. Elementary School - 5th Grade
Teacher: Mrs. Lorraine Jones

Mrs. Jones indicated that she personally benefited from being involved with the Nolde project. She stated that the opportunities for her to interact with other teachers in the project were most rewarding. An observation by the ERANDA staff found the students and teacher to be very enthusiastic about the project. Mrs. Jones also indicated her use of the Nolde curriculum has been very successful. Students became involved in projects such as: reforesting a nearby woods and developing nature trails there. Student-centered discussion of water pollution was sparked by a trip to a community sewage treatment facility. Parent's responses were favorable. This became evident by the many replies Mrs. Jones received from parents offering assistance in the class's work on a community problem. The influence these efforts had were not limited to the one class. The students of Mrs. Jones presented an assembly about "Endangered Species" to some 500 children

in the elementary school. In general, the effect of Nolde project on the students has been favorable for as Mrs. Jones stated, ". . . the children were developing a healthier attitude toward the environment".

George Wolf Elementary School - 5th Grade
Teacher: Mr. Richard Becker

Observations made by the ERANDA staff again indicate a very enthusiastic teacher. This enthusiasm is no doubt spilling over to the students. Students concerned themselves with the condition of a local stream and how it was influenced by the discharges of a sewage plant. Students volunteered their services to the sewage plant manager to assist him in building a diversionary dam to help improve water quality. The children were very energetic about this project. So much so, the plant manager commented that, given the time, the helpers would have built a dam big enough to cause the stream to overflow. Organization of the students' effort was very efficient. Five small groups were formed allowing many facets of the stream to be analyzed. While no formal committee of parents was formed, their assistance was readily available when needed.

Twin Valley School District, Berks County - 5th Grade
Teacher: Mrs. Judy Marrogelle

One of the interesting aspects of this project was the use of a magic circle. The students would talk freely about their feelings concerning the environment. Students' reactions were good. An integral part of the success of the program was the cooperation of the executive committee of the Home and School Association. This group volunteered to serve as a community council for the project. An inter-disciplinary approach was employed utilizing both mathematics and the language arts in varied activities. The teacher noted an increase in the use of library books which related to the topics being discussed. Class visits to a local canal site were limited by both transportation and weather problems. Class activities were varied. The students are planning to construct a publicity booklet for the purpose

of increasing the awareness of the community towards environmental problems and their solutions. Miss Marrogelle indicated her feeling that the students enjoyed their trips to Nolde and that they gained much valuable information from them.

Schoeneck Elementary School - 5th Grade
Teacher: Mr. David Burns

Mr. Burns was working with the equivalent of a fifth grade group in a non-graded elementary school. Students studied the effect of the Pennsylvania Turnpike on the noise level in the area. It is interesting to note Mr. Burns' comments on the changing attitudes of his students throughout the program: 9/15/72: "students attitudes are passive - apathetic"; 10/9/72: "students had good reactions - encouraging; 10/25/72: "continued interest demonstrated - encouraging!". Employing a learning center technique, the teacher's approach was to a degree inter-disciplinary. A vocabulary teacher assisted by instructing the students on environmental terms. Graphing was employed to create pictorial representations of differing decibel levels. During the final week the program took on a literature orientation emphasizing prose, poetry, etc.

While these efforts appeared to affect positive influences to the children, parental response was discouraging. As Mr. Burns commented, "They didn't seem to want to get involved".

Wyomissing Elementary Center - 5th Grade
Teacher: Miss Barbara Hibscham

The fifth graders in this school concentrated their efforts on the varying types of solid waste pollution. After initial discussions of environmental problems the students concentrated on cleaning up the litter in both the school area and in a local community park. Items collected were then analyzed to inform the students of the different rates at which the items could be decomposed. Bar graphs were employed to represent the relative frequency with which each form of trash was found. By comparing the graphs

of the school grounds with the park, students were made aware of the types of people who are responsible for the different types of litter. Art projects employing collages, mobiles, etc. afforded the students an opportunity to both express themselves and also motivate others to become concerned with the litter problems. One comment by Miss Hibscham is of special interest. Referring to the efforts of her students in organizing a presentation for the PTA, Miss Hibscham said, "They worked hard, dedicating their time after school and on weekends willingly and cooperatively".

Secondary:

Cocalico Area Middle School - 7th Grade
Teacher: Miss Georgia Barrett

Miss Barrett indicated she enjoyed the November in-service program at Nolde. She felt it was profitable to hear other teacher's problems and discuss them. Student activities were many and varied, ranging from building bird feeders to designing plans for an outdoor study area involving the use of a non-functional sewage plant located nearby. Parent cooperation was good as evidenced by the 16 (of a possible 23) parents who volunteered for committee work. Miss Barrett's record of student's response to Nolde Park field trips indicates very positive student attitudes toward these activities. Miss Barrett generated an inter-disciplinary approach eliciting the support of math, English, and art teachers.

Perhaps the most beneficial outcome of this project involvement is Miss Barrett's plans to work with a teaching team toward developing a special curriculum on ecology for use in earth science studies next year.

Conestoga Valley School District - 7th Grade
Teacher: Mr. Joseph Forrey

Upon observation, Mr. Forrey appeared as a bright, enthusiastic, mild-tempered instructor. Working with the students, they decided to study a local creek and the plans of the CVA (a local watershed authority) to develop a recreational area along the creek. While Mr. Forrey used the Nolde curriculum, he found it necessary to alter it so as to be more meaningful

to his students. Student involvement in the project was motivated by many of the activities and in particular a 10 mile canoe trip for the purpose of water studies. The students were accompanied by a reporter from a Lancaster newspaper who afforded the project with extensive press coverage. Parent cooperation when specifically needed was excellent but they appeared to resist the organization of a formal council. Mr. Forrey was able, however, to solicit the services of CVA members who volunteered to serve as an advisory council. It is interesting to note that the students regretted they were unable to accomplish much toward the solution of their problem. They felt they should have selected a more specific problem which would have lended itself more readily to solution.

Governor Mifflin Junior High School - 7th Grade
Teacher: Mr. Kenneth Hain

Based on observations made by ERANDA staff, the students appeared to be both enthusiastic and energetic about their project involvement. Mr. Hain presents himself as an experienced and confident teacher. As in other schools parent involvement seemed to be limited to informal cooperation. Parents did not seem anxious to form a formal committee. Students concerned themselves with the impact of man's presence on the condition of a local creek. An inter-disciplinary approach to the project involved both the math and history department. Some plans for continuation of program are of great value. These include a campaign in the spring directed towards cleaning up the creek and soliciting cooperation from the community to maintain the creek. Also planned is the production of a video-taped program depicting the activities of the program to be made available to local educational T.V. channels. Future plans of this type make great strides toward increasing the viability of the desired long term effects of the Nolde project.

St. Paul's School - 7th Grade
Teacher: Miss Rosanna Moyer

Miss Moyer, a first year teacher at St. Paul's, was afforded a very rewarding experience due to both her own motivation and her involvement

with the Nolde project. At the onset of the program, Miss Moyer seemed plauged by both uncooperative students and pesimistic co-horts on the faculty. She was cynically warned by her fellow teachers about the lack of parental interest at St. Paul's. However, at her first meeting with some 21 (out of thirty contacted) parents, 13 parents committed themselves to cooperating with the project. Miss Moyer commented, "The parents were very receptive and very optimistic". While the students at first appeared apathetic and disinterested, by November 7 Miss Moyer reported, "The students were really interested", in that day's exercise. There was also a marked improvement in the students' behavior during the second trip to Nolde as compared to their first trip. The program concentrated on noise pollution. Miss Moyer reported that students learned to discriminate between the different sound levels produced by man-made devices, by contrasting tapes made in urban areas and at the Nolde Park.

Wilson Junior High School
Teacher: Mr. Michael Gerhart

Mr. Gerhart, a capable and organized teacher, received much support from both students and parents in his efforts. Students wrote to some 65 agencies, requesting information on the environment. The first meeting with parents met with great success, some 40 parents attending, 22 of which volunteered to work with the project. One parent discussion concerning what an organized group could do in a community resulted in the organization of local council. Students were exposed to several school personnel, e.g., the school business manager, school transportation director, and also made several field trips including Punches River, Angelica Creek, Cacoosing Creek, and a local Sewage Creek. Students activities were varied concentrating on the analyzing of local litter finds and water conditions in local streams. Students seemed to be well directed towards finding solutions for their problems. Future plans include inviting other sections in the school to cooperate and organizing meetings involving local representatives of community groups. These meetings are geared towards controlling the pollution of the environment.

## V. EVALUATION OF INSTRUCTIONAL MANAGEMENT PROCESS COMPONENT

The facility development was curtailed during the first year of the program due to the dismissal of the firm originally contracted to provide such services. Additionally, decisions congruent to the philosophy of the newly appointed Project Director had to be made concerning the locale of teaching stations and the best utilization of the property. Now, early in 1973, two teaching trails have been completed: Watershed and Earth. On Watershed Trail two teaching stations are built while on Earth Trail the construction for two teaching stations is underway meeting the criterion for Objective 1.3.4.

Assistance from the Nolde staff to project teachers is necessary for a successful project. In order to determine the effectiveness of this assistance, project teachers were asked to respond to a questionnaire. The results appear in Table XVIII. The criterion for Objective 1.3.7 is 90% of the teachers reporting that the staff responded within 5 days and that the response was satisfactory. With 10 of the 11 experimental teachers reporting, the criterion was exceeded in all areas. All (100%) reporting teachers indicated that the Nolde staff responded within 5 working days and that the response was satisfactory. It is interesting to note that the largest numbers of requests are for speaking engagements and for instructional and technical assistance.

Pre and post testing of the fall group and pre testing of the winter group were all completed on time and in accordance with the established criteria for Objectives 1.3.8 and 1.3.9. The testing was monitored by the Nolde staff and randomly checked by members of the ERANDA staff.

The established criterion for all objectives for the Instructional Management Process Component were met or exceeded.

Table XVIII

Experimental Teachers Requests for Assistance
by Nolde Forest State Park

January, 1973

N=10

| Made Request | Yes | | No | | N.A. | | Within 5 days: Yes | | Within 5 days: No | | Response: Satis. | | Response: Unsat. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Technical Assistance | 8 | 80 | 1 | 10 | 1 | 0 | 10 | 100 | 0 | | 8 | 100 | 0 | 0 |
| Instructional Assistance | 9 | 90 | 0 | 0 | 1 | 10 | 10 | 100 | 0 | | | | | |
| Materials | 7 | 70 | 2 | 20 | 1 | 10 | 10 | 100 | 0 | | | | | |
| Supplies | 5 | 50 | 2 | 20 | 3 | 30 | 10 | 100 | 0 | | | | | |
| In-Service | 6 | 60 | 4 | 40 | | | | | | | | | | |
| Speaker | 8 | 80 | 2 | 20 | | | | | | | | | | |

## VI. EVALUATION OF STAFF DEVELOPMENT PRODUCT

The discipline of environmental education is a new and constantly evolving area. Therefore, teachers and project staff participating in a project on environmental education should constantly be growing in their personal expertise. The objectives in this component are aimed at evaluating the degree to which this growth is occurring. Although the dates originally scheduled for some of these objectives were in September, the Project Director felt rating of behaviors which might indicate considerable knowledge of the project would more reasonably be accomplished in November. The results of his November rating of project teachers can be found in Table XV. The criteria of 100% of the experimental teachers being rated at least a three on a five-point scale for Objectives 2.1.1, 2.1.2, 2.1.5, 2.1.6, and 2.1.8 was reached for all objectives. In addition, Objectives 2.1.3 and 2.1.9 required 90% of the teachers to receive a rating of three or better on a five-point scale. This criterion was exceeded for all (100%) of the teachers were so rated. (See Table XVI, page 22)

In order to determine the degree to which the staff is growing in environmental knowledge, the Project Director rated his staff (extending the scheduled date from September to January). The results appear in Table XIX. Objectives rated were 2.1.12, the ability to identify local, state and national environmental problems and solutions; 2.1.13, to identify local,state and national educational programs and facilities; 2.1.14, to demonstrate adequate knowledge of the project curriculum; 2.1.15, to demonstrate adequate understanding of project facilities, functions and philosophies; 2.1.17, to demonstrate administrative competency in execution of assigned tasks; 2.1.18, adequately conduct pre-service training; 2.1.19, adequately conduct pre-service training. The criterion established for each of these objectives is a Project Director's rating of at least three on a five-point scale. Without exception, this criterion has been exceeded, as all staff members received a rating of 4 or better on all objectives. In many instances, all staff members were rated 5 or excellent.

For Objective 2.1.16, demonstrates adequate teaching abilities, a 90% criterion of at least three was established while 100% of the staff is rated 5, or excellent (see Table XIX).

Table XIX

Project Director Rating of Project Staff

January, 1973

N=3

*A = Excellent
B = Good
C = Fair
D = Poor
E = Unacceptable

| Task | Rating* | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 1. Identify local, state and national environmental problems and solutions | 3 | 0 | 0 | 0 | 0 |
| 2. Identify local, state and national environmental programs and facilities | 3 | 0 | 0 | 0 | 0 |
| 3. Adequate knowledge of project curriculum | 3 | 0 | 0 | 0 | 0 |
| 4. Adequate understanding of project facilities | 3 | 0 | 0 | 0 | 0 |
| 5. Understanding of project functions | 3 | 0 | 0 | 0 | 0 |
| 6. Understanding of project's philosophies | 3 | 0 | 0 | 0 | 0 |
| 7. Adequate teaching abilities | 3 | 0 | 0 | 0 | 0 |
| 8. Adequately conduct pre-service training | 3 | 0 | 0 | 0 | 0 |
| 9. Administrative competency in execution of assigned tasks | 2 | 1 | 0 | 0 | 0 |
| 10. Adequately conduct in-service training | 3 | 0 | 0 | 0 | 0 |
| 11. Actively participate in staff meetings | 1 | 2 | 0 | 0 | 0 |

Additional responsibilities fall to the elementary and secondary project coordinators. A close and continuous contact between the coordinator and each experimental program must be maintained. Performance Objective 2.1.20 requires twice monthly meetings complete with minutes. Such minutes do not exist; however, experimental teachers verbally stated to the ERANDA staff members who observed their programs that the Nolde staff was in constant contact. The log reports from the secondary coordinator substantiated his regular meetings. Such a log was not available from the elementary coordinator. Although the formal criterion was not met due to lack of minutes, the evaluators feel the intent of the objective was satisfied.

Performance objective 2.1.22 requires the coordinators' attendance at advisory council meetings, at least 6 for the school year. The Project Director has decided, due to shortage of staff, to require staff attendance at advisory council meetings only when the agenda requires their expertise or when the meeting is of special interest to them, and thus far they have attended only two meetings. Therefore, this criterion was not met. In addition, Objective 2.1.23 requires staff attendance at two local advisory committees for each experimental group. Minutes of the meetings are criterion evidence. No minutes exist from local advisory committee (LAC) meetings. Evidence of the existence of LACs are the eighteen lists provided by the Project Director and responses by project teachers concerning attendance at such meetings.

The evaluators learned in their meetings with the experimental teachers that, although formal lists exist, formal meetings have not been the outcome. Rather, when assistance was needed to expedite the work of the project, the committee was contacted and help was always forthcoming. The criterion for this objective, however, was not achieved.

It is important that information about the Nolde Forest State Park be disseminated to as large a population as possible. Speaking to community groups (Objective 2.1.24) is an effective way of accomplishing this.

Examination of the secondary coordinator's log indicates that eight presentations have been made since September. In addition, at least 12 in-service meetings were prepared for teachers at all grade levels in the district, at levels K to 12.

The elementary coordinator logs were not available for assessment. In spite of this omission, the criterion for the objective has been met.

The project coordinators are expected to develop learning activities which can be used as curriculum supplements by teachers. Objective 2.1.25 requires one unit per month per staff member. No formal record has been kept as to individual input; however, the number of activities now available totals 350. This number greatly exceeds the criterion established.

Regular contributions about Nolde through news media and the Project Newsletter are required of the project staff (Objective 2.1.26): The contribution of one article to local news sources and one article in each issue of the Newsletter. Space does not permit input by all staff in each issue of the Newsletter but all staff members are regular contributors. This does not meet the established criterion.

The field trip community guides are knowledgeable personnel whose responsibilities have been delineated in the following manner. The field trip community guides are expected to (Objective 2.1.27) aid teachers and project staff during field trips, (Objective 2.1.28) aid project coordinators by maintaining and organizing instructional materials and equipment, (Objective 2.1.29) aid the project staff in the execution of assigned duties, (Objective 2.1.30) demonstrate positive attitudes toward the project management team and (Objective 2.1.31) adequately conduct field experiences at the Nolde site. The criterion for each of these objectives is a rating by the Project Director of three or better on a five-point scale. Table XX indicates that all guides exceeded the criterion on all objectives by achieving a rating of at least 4.

Table XX

Project Guides Rating by Project Director

January, 1973

N=18

| Activity | Rating* | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 1. Aid teachers and staff during field trips | 8 | 0 | 0 | 0 | 0 |
| 2. Maintain and organize instructional materials and equipment | 5 | 3 | 0 | 0 | 0 |
| 3. Aid project staff in the execution of assigned duties | 8 | 0 | 0 | 0 | 0 |
| 4. Demonstrate positive attitude toward Project management team | 5 | 3 | 0 | 0 | 0 |
| 5. Adequately conduct field experiences at the Nolde site | 8 | 0 | 0 | 0 | 0 |
| 6. Demonstrate an adequate knowledge of environmental concepts | 1 | 7 | 0 | 0 | 0 |

*A = Excellent
B = Good
C = Fair
D = Poor
E = Unacceptable

## VII. EVALUATION OF STAFF DEVELOPMENT OPERATIONAL PROCESS OBJECTIVES

There are only three objectives relating to this component to be evaluated in January. The adequacy and immediacy of response to requests for in-service training and consultant services are the thrust of Objectives 2.2.2 and 2.2.4. A questionnaire was submitted to teachers, community persons, local and central advisory committee members. The results of that questionnaire appear in Table XXI. It was required that 100% of those responding to the questionnaire report that the Nolde staff responded within 5 working days and that 80% of those responding found the response adequate.

Table XXI

Nolde Staff Assistance to Speakers and Project Teachers

January, 1973

N=21

| Type of Assistance | | Rating[I] | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 5 | 4 | % | 3 | 2 | 1 | 0 |
| 1a | Secretarial | 5 | 4 | 90 | 1 | 0 | 0 | 11 |
| 2a | Meeting Place | 12 | 4 | 100 | 0 | 0 | 0 | 5 |
| 3a | A-V Equipment | 4 | 4 | 88 | 1 | 0 | 0 | 12 |

to Local and Central Advisory Committees

January, 1973

N=22

| | | | | | | |
|---|---|---|---|---|---|---|
| 1b | Secretarial | 6 | 3 | 90 | 1 | 12 |
| 2b | Supplies | 7 | 6 | 100 | | 9 |
| 3b | Meeting Place | 13 | 4 | 100 | | 5 |
| 4 | Project Act. | 13 | 4 | 100 | | 5 |
| 5 | Rating[II] | 14 | 3 | | | 5 |
| 6 | Response to Request[III] | 10 | 3 | | | 9 |

[I] 5 Very adequate
4 Adequate
3 Neither adequate nor inadequate
2 Inadequate
1 Very inadequate
0 Did not request

[II] All the time
Most of the time
About half the time
Almost never
Never

[III] Very adequate
Adequate
Inadequate
Very inadequate
Did not request assistance

Table XVIII, page 32, indicates that the objective was met for 100% of the responding teachers indicated that they had received a response within 5 days and that they all found the response adequate; while Table XXI (5 & 6) indicates that local and central advisory committee members who requested assistance did receive a prompt response and 100% found the response to be either adequate or very adequate.

Objective 2.2.3 reflects how effective the staff input is in staff meetings. Table XIX, page 34, indicates that all the staff exceeded the criterion of a rating of three or better on a five-point scale.

## VIII. EVALUATION OF STAFF DEVELOPMENT MANAGEMENT PROCESS OBJECTIVES

The arrangements for in-service training should be accomplished promptly in a manner satisfactory to those requesting the training (Objective 2.3.7). A questionnaire was submitted to the experimental teachers and those community personnel requesting in-service training. The criterion was that 90% would respond that they were contacted within 5 working days with satisfactory results. Table XVIII, page 32, indicates that all (100%) teachers who requested in-service training received a response within 5 days and rated the response at least satisfactory.

A staff to function well must be well informed. Objectives 2.3.8, 2.3.9 and 2.3.10 require good communication between Director and staff concerning all meetings, what has transpired and what in-service needs the staff may have. Table XXII indicates all staff members are regularly informed and that the criteria for these objectives have been met.

In addition, bi-weekly meetings are to be conducted with the staff (Objective 2.3.11) and aides (Objective 2.3.12). Minutes exist to substantiate that these meetings are being held.

## IX. EVALUATION OF MATERIALS DEVELOPMENT PRODUCT

On-going reports of the project can be a useful tool to evaluate progress. The staff is required to submit interim reports (Objective 3.1.1) which

Table XXII

Staff Questionnaire

January, 1973

N=3

| Receive Written Agenda | Yes | No |
|---|---|---|
| Regular Staff Meetings | 3 | 0 |
| Special Staff Meetings | 3 | 0 |
| Advisory Committee Meetings | 3 | 0 |
| **Receive Minutes** | | |
| Staff Meetings | 3 | 0 |
| Within 5 Days | 3 | 0 |
| **Surveyed for Needs for In-Service** | 3 | 0 |

Assistance Received

| Need | Rating* | | | | | |
|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 | 0 |
| Secretarial Assistance | 1 | 2 | 0 | 0 | 0 | 0 |
| Meeting Place | 1 | 2 | 0 | 0 | 0 | 0 |
| A-V Equipment | 1 | 2 | 0 | 0 | 0 | 0 |

*Key: 5 = Very Adequate
4 = Adequate
3 = Neither Adequate nor Inadequate
2 = Very Inadequate
1 = Did Not Request nor Use It

consisted of extensive reports on the fall experimental programs. Staff members are to also maintain a daily work log (Objective 3.1.3) which can be an effective tool for evaluation, cross-indexing, verification and recall. One staff member submitted copies to the evaluators; the other keeps an appointment calendar log which ERANDA checked at Nolde.

All staff members should maintain logs. This objective was not met.

Objective 3.1.4 requires a monthly report delineating staff roles within the project. Monthly reports have not been written, hence, this objective has not been met.

A bi-monthly Newsletter (Objective 3.1.7) has been published and is disseminated to a constantly expanding list of interested persons. Also, environmental resource library (Objective 3.1.8) is constantly being improved. Criteria for these objectives have been met.

Although not due for completion until February, the Director's Quarterly Report (Objective 3.1.10) is completed and has been disseminated. It is extremely informative and should be read by interested parties.

The work logs, previously referred to as the teacher's logs, for all (100%) the experimental teachers (Objective 3.1.12) are available. This performance meets the criterion set for this objective.

Two objectives in this component are not being met. Staff logs are required of all staff members; with the exception of the secondary coordinator, these logs are not being kept. In addition, monthly reports delineating staff responsibilities are not being kept. All other objectives have been met.

## X. EVALUATION OF MATERIALS DEVELOPMENT OPERATIONAL PROCESS

The close cooperation between experimental teachers and the Nolde staff should lead to teacher involvement in staff reports (Objective 3.2.1). The experimental teachers' input in the staff interim report is evidenced by the utilization of information in teacher logs.

Objectives 3.2.3 and 3.2.4 require the design and distribution of forms to the project staff for assessing their needs and the analyzing and

distribution of the data obtained. Such information is part of the regular bi-monthly staff meetings. Additionally, the central community advisory committee has initiated preceding to aid in the needs assessment.

Objectives 3.2.10 and 3.2.11 require bi-monthly production and distribution of a Newsletter. A regular bi-monthly Newsletter is prepared and disseminated to a mailing list of over 350 individuals, schools, civic organizations and others requesting it.

A formal questionnaire was mailed to 148 persons to determine the percent of recipients who were receiving the Newsletter. Of 148 questionnaires distributed, 116 (78%) were returned. Of those responding, twenty-eight percent indicated they received no materials, 81 (70%) indicated they had received the Newsletter, falling short of the established criterion of 90%.

Objective 3.2.15 requires speakers to respond to a questionnaire designed to elicit whether or not the Nolde staff was prompt (within 5 days) in responding to requests and that 80% responding that arrangements were adequate. Table XXI, page 38, indicates that all speakers responding to the questionnaire indicated that they had received a response within 5 days and found the arrangements adequate.

Although in general the Nolde production meets the established criteria, the percentage of persons responding to having received the Newsletter falls short.

## XI. EVALUATION OF MATERIALS DEVELOPMENT MANAGEMENT PROCESS

It is important to any organization that secretarial assistance, meeting places and audio-visual tools are available to staff members and other persons logically requiring their assistance. Objectives 3.3.1, 2, and 3 require the Project Director to be responsible for providing such assistance. Questionnaires were sent to staff members, teachers, council members and speakers to elicit their assessment of the services provided them. Table XXI, page 38, indicates 90% or more of experimental teachers and speakers found the

secretarial assistance and meeting places adequate. However, the A-V materials fell slightly below the criterion of 90% (88%). The staff responses found in Table XXII, page 40, indicate the whole staff (100%) found all three adequate to meet their needs.

The environmental resources library is a valuable source of materials for staff. Objective 3.3.7 delineates the time-line for the procurement of additional materials. This time-line was not only followed but was completed earlier than scheduled.

The objectives in this component with slight deviation have been met.

## XII. EVALUATION OF COMMUNITY INVOLVEMENT PRODUCT

Product objectives are primarily contained in the final report. However, in order to assess the degree to which the program is moving toward meeting long range goals, they will be touched upon briefly. Objectives 4.1.7 and 4.1.8 require use of the Nolde site by 200 community members and students (7,500) not connected with the project participants. To date, the user log (Table XXIII) indicates that these goals will be met. The user log also indicates the type of meetings held with breakdown per grade level, pre-school to college senior and adult. It is an effective presentation. In May the data will be analyzed to determine if specific numbered criteria have been met.

Table XXIII

Comparison of 1971-2 and 1972-3 Participation at Nolde Forest State Park Site

| | 71-2 | 72-3 |
|---|---|---|
| September | 0 | 508 |
| October | 100 | 1,519 |
| November | 65 | 1,129 |
| December | 25 | 232 |

The use of Nolde site by community members not involved in the project is the target audience for Objective 4.1.9. Using the user log for the four months of September through December, 1972, there is an indication of 24 programs which were held in response to various community agency requests. This performance far exceeds the established criterion of 5 such meetings. It should also be mentioned that many additional requests were not honored due to the shortage of staff.

The behavioral objectives in this component are not scheduled for completion until May. Survey of performance to date indicates the objectives are proceeding adequately.

## XIII. EVALUATION OF COMMUNITY INVOLVEMENT OPERATIONAL PROCESS OBJECTIVES

This component assigns the Project Director certain responsibilities in eliciting community participation of an advisory nature. Objective 4.2.1 requires an invitation be sent to the community-at-large for all project program areas. Copies of such invitations have been received by ERANDA. The Director is also responsible for holding bi-monthly advisory committee meetings (Objective 4.2.4). The minutes for these meetings confirm such meetings have taken place. However, minutes of local advisory committee meetings (Objective 4.2.5) do not exist.

In order to determine the amount of involvement local and central advisory committee members experience, they were asked to respond to a questionnaire concerning project planning, needs assessment, dissemination and evaluation. Their responses appear in Table XXIV. The table clearly indicates many members were involved in Nolde activities. Of those responding, 75% or more felt their involvement was favorable.

Objective 4.2.9 requires detailed minutes for local and central advisory committee meetings. As was previously mentioned, minutes of local advisory council meetings do not exist.

The objectives in this component have been met for the central advisory committee. However, at the local level criteria are not being met.

Table XXIV

Extent of Involvement in
Nolde State Forest Program
by Local and Central Advisory Committee Members *

January, 1973

N=23

| Activity | 0 | 1 | % | 2 | % |
|---|---|---|---|---|---|
| Project Planning | 8 | 2 | 14 | 13 | 86 |
| Delineating Activities | 12 | 2 | 19 | 9 | 81 |
| Establishing Priorities | 8 | 3 | 25 | 12 | 75 |
| Project Evaluation | 8 | 1 | 7 | 14 | 93 |
| Dissemination | 12 | 2 | 19 | 9 | 81 |

*Central Advisory Committee members have specific committee assignments.

Key: 0 = not involved
1 = unfavorable involvement
2 = favorable involvement

XIV. EVALUATION OF COMMUNITY INVOLVEMENT MANAGEMENT PROCESS

The Project Director's responsibility to the community is largely one of providing supportive services. Objective 4.3.2 requires 90% (of the local and central advisory) committee members responding that secretarial assistance, supplies and A-V equipment was adequate. Table XXI, pg.38, indicates that criterion was met. In addition, the staff was required (Objective 4.3.3) to prepare and disseminate invitations to parents concerning times, agendas, and places of project and related events. Mailing lists confirm this was done.

However, attempts to identify input from the community in reports dealing with project planning, dissemination, needs assessment, and evaluation (Objective 4.3.5) were fruitless. Table XXIV confirms that members of local and central committees felt they were involved although their input was not clearly defined in said reports. The dissemination plan (Objective 4.3.7) has been delineated and put into effect this fall. A questionnaire was sent to all recipients of disseminated materials and the results of that survey will be used to evaluate the plan and to make revisions if deemed necessary. These results of this questionnaire have been used to revise and up-date mailing lists. This criterion is being met.

The utilization of the expertise of the advisory committees is reported in Table XXIV (Objective 4.3.8) and, as indicated before, with the exception of establishing priorities where an only 75% favorable response was obtained, 80% or more responded favorably to their involvement in Nolde activities.

Objectives 4.3.9 and 4.3.10 require input from the local advisory committees. There is no evidence available to substantiate that either of these criteria were met.

## XV. SUMMARY AND CONCLUSIONS

There is no doubt in the minds of the evaluators that the Nolde State Forest Project continues to demonstrate commendable progress. The Project Director, Mr. Louis Ritrovato, evidences strong leadership and is backed up by an interested and dedicated staff. Almost all performance criteria are being exceeded. Only a very few objectives are not being accomplished.

The major problem confronting the project is lack of staff. The very recent addition of a new secretary should reduce the staggering burden of detail work for the project secretary. However, the evaluators do not understand why it took four months to replace a secretary who left and whose leaving date was known at her time of hiring.

Additionally, the project lacks a staff member who could devote the vast majority of his time to curriculum development. The materials developed this summer now have been tested in the classroom by experimental teachers and fresh input is available. These materials and activities which are constantly being developed must now be revised with necessary coordination and integration.

Additional staff is needed to help the Director and to meet expanding requests for use of project activities, especially over weekends. Currently, project coordinators put in a fifty hour plus week. The Project Director's week is much longer. Requests for in-service have grown to the point where twelve requests had to be turned down for lack of staff. Given the importance of environmental education, these requests should not go unanswered. Three full-time educational staff members plus one full-time teaching naturalist are not sufficient to run a project of this size. The project is successful because the staff is producing. The only thing holding the project back from an even greater accomplishment is the lack of staff. Additional money should be allocated to meet these staff needs.

There are two areas which were criticized in the Interim Report. First, concern was expressed about sufficient in-service training being given experimental teachers. In-service training consisted of two one-day programs with considerable time being expended to interpret details. Many teachers entered this program with little or no training in environmental education. One winter experimental teacher volunteered to the evaluator that part of her motivation came from a desire to increase her expertise in this area. An effort should be made to allocate more time to in-service training prior to each program's inception. In-service training has been provided for those teachers requesting it. However, many teachers are typically reluctant to request or lack the time to undergo it. In cooperation with Penn State University an Environmental Education Program, graduate level, was held at Nolde over the summer. It would be desirable to be able to work out logistics, including financial, that would enable all project

teachers to participate in this or similar six-week sessions. This past summer a few project teachers paid their way to the session.

Second, the evaluators expressed concern about the staff's ability to communicate activities. The final reports for experimental schools were helpful as were the logs submitted by the secondary coordinator. The evaluators have sought to further increase their sources of information by developing a form for the coordinators to use when critical incidences occur. A similar form, developed by ERANDA, has worked well with project teachers. The elementary coordinator should also maintain such a log.

In general, the project has been successful in meeting or exceeding its behavioral objectives in the instructional, staff development and materials development components. Cross-indexing by text and tables further substantiates this. However, there is one area where the project is consistently not meeting stated objectives. The area of community development falls short primarily in relation to the creation, continuation and integration of local and central advisory committees. These committees are important as they provide direct liaison with the community, its people, agencies and government. While their function is not one of decision-making, their feedback should provide valuable advisory assistance in terms of establishing priorities and indicating needs in the project. This potential source is not being effectively tapped.

Although not formally part of the evaluation design, the evaluators feel there is an area in which the project is excelling. The facilities at Nolde State Park are being utilized in many diversified ways. Activities include, among others, research, in-service, project description history, and environmental studies. This indicates especially effective use of the Park, in spite of a limited staff.

The project is significantly improving the environmental knowledge of the participating students as well as changing their attitudes, in a more positive direction, towards the environment. Most often this growth is superior to similar-type students not participating in the project. These changes are occurring more in the urban groupings, where they are probably needed most.

To summarize, the Nolde State Forest Project has been extremely successful in utilizing to the fullest its expertise, staff and facilities. With the few exceptions cited, it has met its stated objectives at levels consistently above what was expected.